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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/463,643	05/01/2000	SHUJI NAKAMURA	NICHIA-00700	6608
7590	10/18/2004		EXAMINER	
ARTHUR R. CRAWFORD NIXON & VANDERHYE P.C. 8TH FLOOR 1100 NORTH GLEBE ROAD ARLINGTON, VA 22201-4714			BAUMEISTER, BRADLEY W	
			ART UNIT	PAPER NUMBER
			2815	
DATE MAILED: 10/18/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/463,643	NAKAMURA ET AL.
	Examiner	Art Unit
	B. William Baumeister	2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 27 July 2004.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 62-78 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 62-78 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 27 July 2004 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 70-78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 70 sets forth a superlattice of GaN doped less than 1e17. It is clear that this claim includes a clerical error because in order to form a superlattice, either the materials of the barriers and wells have to be different (see e.g., claim 62) or alternatively the barrier/well doping has to be significantly different (see e.g., mod-doped Example 14 of the present application). From Applicants contemporaneously-filed comments, it appears sufficiently clear that applicant intended to claim a mod-doped superlattice. However, the objective metes and bounds of the claims, as intended, are not reasonably clear.

### ***Claim Rejections - 35 USC § 102***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 62-69 are rejected under 35 U.S.C. 102(e) as being anticipated by Itaya et al. '017. See e.g., embodiment 2 (FIGs 8A-D and cols. 13-) as modified by embodiment 4 disclosed at col. 16, lines 35-38. The embodiment includes from the bottom up: a sapphire substrate; a LT-

AlGaN buffer 502; a first layer (this optional layer is not depicted in FIG 8, but is discussed e.g., at col. 16, lines 35-38) which is composed of undoped (i.e., doped  $\sim 1e16$ ) GaN interposed between the LT-buffer 502 and the n-GaN layer 503; a second single layer 503 which is 4 um thick, has a Si doping concentration of  $3.6e18$  (col. 14, line 38), and has an n-electrode formed thereon (cf. FIG 7C depicting n-electrode 408); and a MQW active layer 506 composed of undoped InGaN wells and undoped GaN barriers, reading on the third layer, as claimed.

b. Regarding claim 68, regardless of whether Itaya sets forth the thickness of the undepicted first, u-GaN layer specifically in regard to the 2<sup>nd</sup> embodiment as modified by the 4<sup>th</sup> embodiment, the reference does set forth in the 9<sup>th</sup> embodiment (FIG 16) that this u-GaN layer has a thickness of 0.3 um (e.g., col. 21, line 40).

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
6. Insofar as definite, claims 70-78 rejected under 35 U.S.C. 103(a) as being unpatentable over Itaya as applied to the claims above, and further in view of Ng, “complete Guide to Semiconductor Devices.”
  - a. Itaya discloses all of the limitations as set forth above except for the modification set forth in the present claim set wherein the claimed third layer is composed of mod-doped GaN superlattice. Rather, Itaya teaches an LED having an InGaN/GaN superlattice active layer.

- b. Ng teaches that it was known to provide mod-doped n-i-p-i superlattices for an LED's active layer.
- c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have substituted n-i-p-i GaN superlattice for the (In)GaN superlattice of Itaya for the purposes of reducing lattice mismatches in the active region while still enabling the emission of longer wavelengths than would be emitted by bulk GaN.

***Response to Arguments***

- 7. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

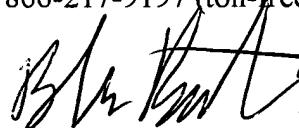
- 8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).  
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. William Baumeister whose telephone number is (571) 272-1722. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



BRADLEY BAUMEISTER  
PRIMARY EXAMINER

B. William Baumeister  
Primary Examiner  
Art Unit 2815

October 9, 2004